

The Flora of Niuatoputapu Island, Tonga
Pacific Plant Studies 32

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Geography

Niuatoputapu Island is almost at the northern end of the Tongan chain and is very close to Samoa (140 miles to Upolu Island). Its closest neighbors are the volcanic ash cone of Tafahi, only 5 miles to the north, and Niuafu'ou (Tin Can) Island, some 120 miles to the west.

Niuatoputapu is of volcanic origin, with a central ridge of bedded tuff, breccia, and lavas which rises to a maximum height of 165 meters. Surrounding this central ridge is a terrace, probably wave-cut in origin and Pleistocene in age, now covered with a thick and fertile deposit of clay soils. Falling away in a relatively steep bluff, this terrace is in turn surrounded by an apron-like plain of uplifted recent marine sediments: sand, coral cobbles, and other reef detritus. This apron of low-lying terrain has been uplifted as a result of tectonic activity within the period of Polynesian occupation of Niutoputapu. The island is 6.8 kilometers long and 4.5 kilometers wide.

The vegetation of Niuatoputapu has been extensively modified as a result of some 3,000 years of Polynesian occupation. The present Tongan-speaking population practices a form of shifting cultivation (or bush-fallow rotation) in which the principal garden type is the mixed yam-aroid swidden (refer to P. V. Kirch, "Indigenous agriculture in Uvea" in press, Economic Botany) for a description of a highly similar West Polynesian agricultural system. The principal cultivated yams are Dioscorea alata and D. esculenta; among the cultivated aroids are Colocasia esculenta, Alocasia macrorrhiza, and Xanthosoma sagittifolium. Bananas, particularly diploid hybrids of the Musa section, are extensively planted in swiddens following the harvest of yams and aroids. Arboriculture also is a sig-

nificant part of the indigenous agricultural system, with Artocarpus altilis being the dominant crop. Inocarpus fagifer is also widely cultivated.

Exploration

The first plant collection on Niuaotoputapu was made by Dr. H. Hürlimann, of Basel, between Dec. 5, 1951, and Jan. 2, 1952. He collected 79 species, and the specimens are deposited in the herbaria of the University of Zürich, and of DePauw University.

A recent collection was made by the anthropologist Dr. Patrick V. Kirch, of the Bishop Museum. He collected between July and December, 1976, and gathered 138 species of vascular plants, many of which duplicated and confirmed those of Hürlimann, but 59 others were new locality records.

Flora

The flora as now known total 10 ferns and fern allies and 201 phanerogams. These are classed as:

Indigenous	91
Endemic	1
Ornamentals	19
Crops	53
Weeds	<u>37</u>

201 total flora

Comparisons have been made with the published flora of Tonga by Yuncker (1959).

Many of the Pacific Islands have notable endemism in their floras, but it is not so with Niuaotoputapu. Although politically placed in Tonga, the island is closest to Samoa, which is 140 miles to the northeast. Futuna is 290 miles to the northwest. Taveuni in Fiji is 400 miles to the west. Niue is 320 miles to the southeast; and Rarotonga is 1,020 miles to the southeast. Of the larger islands of Tonga which lie to the south, Vavau is 160 miles distant.

When the flora is compared with that of these adjacent islands, it is found that all of the indigenous species are also found in Samoa, except 10. These are: Pandanus Mbalawa, P. odoratissimus, var. Setchellii, Ficus Storckii, Santalum Yasi,

Canavalia sericea, Dysocylum Forsteri, Eugenia dealata, Burckella Richii, Ipomoea macrantha, and Solanum amicornum.

When compared with the flora of Fiji, it is found that all of the indigenous species also occur there, except 11. They are: Pandanus odoratissimus, var. Setchellii, Rhus taitensis, Melochia aristata, Eugenia clusiaefolia, Eugenia dealata, Burckella Richii, Planchonella torricellensis, Hoya chlorantha, Solanum amicornum, and Psychotria insularum.

When compared to Vavau, the nearest high Tongan Island to the south, all of the indigenous species are also there except: Psilotum nudum, Nephrolepis biserrata, N. exaltata, Pandanus angulosus, P. Mbalawa, P. turritus, Fimbristylis pycnocephala, Taeniophyllum fasciola, Trema orientalis, var. viridis, Ficus scabra, Sesuvium Portulacastrum, Canavalia sericea, Vigna marina, Suriana maritima, Securinega samoana, Terminalia Catappa, Eugenia dealata, E. neurocalyx, Burckella Richii, Planchonella torricellensis, Diospyros elliptica, Geniostoma insulare, forma insulare, Hoya chlorantha, and Ipomoea macrantha.

Likewise, less affinity is shown to the flora or other islands. Niue Island lacks 24 of the species; and Rarotonga lacks 44.

Hence, it is evident that the flora of Niua-toputapu is very closely, and almost equally, related to that of Samoa and of Fiji, and much less so to the large islands of southern Tonga.

The following species are additions to the known flora of Tonga: Amorphophallus campanulatus (Roxb.) Bl., "lena," a cultivated food plant; Planchonella torricellensis (K. Schum.) H. J. Lam, "kalaka," an indigenous tree, common in Samoa; Hoya chlorantha Rech., a native vine, also known in Samoa; and Gardenia rotumaensis St. John, a cultivated ornamental tree, called "siale lotuma," (= Gardenia from Rotuma). It is a native to Rotuma Island, to the north of Fiji.

List of the Vascular Flora

The indigenous species are distinguished by italic type.

PTERIDOPHYTA

Psilotaceae

Psilotum nudum (L.) Griseb. On tree trunks, Kirch 240; on limestone, Hr limann 205.

Lycopodiaceae

Lycopodium sp. An epiphyte similar to L. phyllanthum, observed by Kirch.

Pteridaceae

Pteris tripartita Sw. "hulufe." Climax forest, Kirch 287.

Davalliaceae

Davallia solida (Forst. f.) Sw. "lau fare," and "lau fale." On tree trunk, Kirch 176; in shade, Kirch 182.

Nephrolepis biserrata (Sw.) Schott. "hulufe." In shade, Kirch 181.

Nephrolepis exaltata (L.) Schott. "lau fale." Coastal strand, Kirch 245.

Aspidiaceae

Cyclosorus invisus (Forst. f.) Copel. "hulufe." Mesophilous forest, Hr limann 342.

Aspleniaceae

Asplenium nidus L. "katafa." Second growth on ridge, Kirch 224.

Polypodiaceae

Phymatodes scolopendria (Burm.) Ching. In shade, Kirch 183. Like the Malayan plants, it has the sori in double rows on each side of the midrib.

Pyrrhosia adnascens (Sw.) Ching. On Cocos trunks, Kirch 310.

SPERMATOPHYTA

MONOCOTYLEDONES

Cycadaceae

Cycas circinalis L. Cultivated. Hr limann 616.

Pandaneaceae

Pandanus angulosus St. John. "fa." Regenerated forest near ridge summit, Kirch 188.

Pandanus Mbalawa St. John. "fafa," and "fa tea." Offshore islet, Kirch 279. New for Tonga, growing also on Fulanga Island, Fiji.

Pandanus odoratissimus L. f., var. Setchellii

Humid alkaline sands, Hürlimann 388.

Pandanus turritus Martelli. "fala hola." Only one tree, cultivated by a house, Kirch 266.

Fruit used for "kahora." Native to Samoa.

Pandanus spp.

"kie." Kirch 300. Leaves used for plaiting.

"tofua tapahina." Kirch 301. Leaves used for plaiting.

----- Kirch 328. Leaves used for plaiting.

Gramineae

Bambusa vulgaris Schrad. "pitu." Second growth forest, Kirch 345.

Cenchrus echinatus L. "hefa." Coastal strand, Kirch 252.

Centotheca latifolia (L.) Trin.

C. lappacea (L.) Desv. Forest clearing, Hürlimann, 377; edge of plantation, Hürlimann 635; grassland, Kirch 211. r

Cynodon Dactylon (L.) Pers. Roadside, Hürlimann 634.

Eragrostis tenella (L.) Beauv. ex R. & S.

"musie." Roadside on sandy soil, Hürlimann 378; coastal strand, Kirch 253.

Miscanthus floridulus (Labill.) Warb. "kaho."

Dry forest on volcanic soil, Hürlimann 349.

Paspalum conjugatum Berg. "mohuku." Roadside, Hürlimann 633

Paspalum distichum L. (*P. vaginatum* Sw.).

Alkaline mud, Hürlimann 641.

Saccharum officinarum L. "to." Second growth swidden, Kirch 315.

Sporobolus elongatus R. Br. "musie." Coastal strand, Kirch 249.

Sporobolus indicus (L.) R. Br. Grass lawn,

Hürlimann 327; roadside, Hürlimann 647.

Urochloa ambigua (Trin.) Pilger. Roadside, Hürlimann 620.

Zea Mays L. Observed by Kirch.

Cyperaceae

Cyperus brevifolius (Rottb.) Hassk. "musie." Grassland, Kirch 184.

Cyperus compressus L. "pakopako." Roadside, Hürlimann 394.

Cyperus javanicus Houtt. "mahelehele." and

"musie." Wet sandy muddy soil, Hürlimann 384;

swampy pond edge, Kirch 341.

Cyperus rotundus L. "pakepake.: Grassland, Hürlimann 326.

Fimbristylis autumnalis (L.) R. & S., var. *complanata* (Retz.) Kuekenth. "takataka." Wet sandy muddy soil, Hürlimann 383.

Fimbristylis pycnocephala Hbd. "pakopako," and "pako fae lolo."

F. cymosa R. Br., var. *pycnocephala* (Hbd.)

Kuekenth., f. *pycnocephala*, and f.

paupera Hürlimann, *Bauhinia* 3: 193, 1967.

Wet soil, Hürlimann 387; sandy soil, Hürlimann 671; tidal swamp, Kirch 308.

Scleria lithosperma (L.) Sw. "musie." Grassland, Kirch 185.

Scleria polycarpa Boeck. "mahelehele," and "musie."

S. margaritifera sensu Hürlimann, non Gaertn.

Dry forest, Hürlimann 356; grassland, Kirch 185.

Palmae

Cocos nucifera L. "niu." Secondary forest, Hürlimann 632; observed by Kirch.

Pritchardia pacifica Seem. & Wendl., var. *pacifica*. Second growth forest, Kirch 239. Fruit edible; leaves used for umbrellas. "piu."

Araceae

Alocasia macrorrhiza (L.) Schott. "kape." Swidden garden, Kirch 321.

Amorphophallus campanulatus (Roxb.) Bl. "lena." In second year swidden, Kirch 191.

Colocasia esculenta (L.) Schott, var. *antiquorum* (Schott) Hubb. & Rehd. "talo Tonga." The cultivars are:

"talo Niue." Second year swidden, Kirch 194.

"talo uli." Second year swidden, Kirch 200.

"talo vahe." Second year swidden, Kirch 199.

"lau ila." Second year swidden, Kirch 193.

Cyrtosperma Chamissonis (Schott) Merr. "via." Observed by Kirch.

Epipremnum pinnatum (L.) Engler. Vine on coconut tree, Kirch 220.

Xanthosoma sagittifolium (L.) Schott. "talo Futuna." Second year swidden, Kirch 196; and "talo tea." Kirch 195.

Bromeliaceae

Ananas comosus (Stickm.) Merr. "fainā." Second year swidden, Kirch 314.

Commelinaceae

Rhoeo spathacea (Sw.) Stearn. "faina faitoka." Coastal strand, Kirch 250.

Liliaceae

Cordyline terminalis (L.) Kunth, var. terminalis.

"si." In second growth, Kirch 186. Formerly roots eaten; leaves used as ornaments, Kirch 186.

Amaryllidaceae

Crinum asiaticum L. Escaped, Hürlimann 399

Zephyranthes candida (Lindl.) Herb. Grassland, Hürlimann 398.

Taccaceae

Tacca ^oLeontopetalides (L.) Ktze. "mahoa'a." Secondary forest, Hürlimann 363; coastal strand, Kirch 241.

Dioscoreaceae

Dioscorea alata L. "ufi." The cultivars are:

"kahokaho." Second year swidden, Kirch 187.

"kaumeile." Second year swidden, Kirch 203.

"kulo." First year swidden, Kirch 198.

"tuaata." Second year swidden, Kirch 197.

Dioscorea bulbifera L. "hoi." Mesophilous coastal forest, Hürlimann 650; third year swidden, Kirch 205; in second growth, said to be poisonous, Kirch 347.

Dioscorea esculenta (Lour.) Burkill. "ufi lei lotuma" (=Rotuma). Second year swidden, Kirch 201; Kirch 202.

Dioscorea nummularia Lam. "palai." Observed by Kirch.

Dioscorea pentaphylla L. "lena." In garden complex, Kirch 333.

Musaceae

Musa, hybrids. "hopa." Observed by Kirch.

Zingiberaceae

Hedychium coronarium Koenig in Retz.

Cultivated, Kirch 325.

Zingiber Zerumbet (L.) Roscoe in Sm. Around garden house, Kirch 324.

Cannaceae

Canna indica L. Abandoned garden, Kirch 216.

Orchidaceae

Dendrobium Tokai Rchb. f. "pipini." On tree trunk in tidal swamp, Kirch 313.

Taeniophyllum fasciola (Forst. f.) Rchb. f. On trunks of *Cocos* at edge of tidal swamp, Kirch 309.

Vanilla planifolia Andrews. "vanilla." Cultivated, Observed by Kirch.

DICOTYLEDONES

Casuarinaceae

Casuarina litorea Stickm. (*C. equisetifolia* L.) "toa." Dry forest on ridge, volcanic soil, Hürlimann 355; and observed by Kirch.

Piperaceae

Piper methysticum Forst. f. "kava." Second growth swidden, Kirch 232. Roots used to make a beverage.

Ulmaceae

Trema orientalis (L.) Bl., var. *viridis* Lauterb. "mangele." Secondary forest on ridge, volcanic soil, Hürlimann 637.

Moraceae

Broussonetia papyrifera (L.) Vent. "hiapo." Observed by Kirch.

Artocarpus altilis (Parkins. ex Z) Fosb. "mei." Cultivated tree in garden, Kirch 327.

Ficus obliqua Forst. f. "ovava." Mesophilous forest, Hürlimann 372; coastal strand, Kirch 337.

Ficus scabra Forst. f. "masi." Mesophilous forest on volcanic soil, Hürlimann 338; second growth on ridge, Kirch 222.

Ficus storckii Seem. "masi." Second growth, Kirch 294.

Ficus tinctoria Forst. f. "masi." Coastal tidal swamp, Kirch 307.

Urticaceae

Pipturus argenteus (Forst. f.) Wedd., var. *lanosus* Skotts. Dry forest on volcanic soil, Hürlimann 364; second growth on ridge, Kirch 230.

Santalaceae

Santalum Yasi Seem. "ahi." Forest on ridge, volcanic soil, Hürlimann 350; second growth forest with Myrtaceae, Kirch 339.

Amaranthaceae

Achyranthes aspera L. "tamatama." Third year swidden, Kirch 206; clearing in climax forest, Kirch 299.

Nyctaginaceae

Boerhavia diffusa L. Weed, Hürlimann 630.

Pisonia grandis R. Br. "pukavai." Large tree in climax forest, Kirch 295.

Aizoaceae

Sesuvium Portulacastrum (L.) L. On coral apron, Kirch 269.

Annonaceae

Cananga odorata (Lam.) Hook. f. & Thoms. "honolulu." "mohokoi." Cultivated shrub, Kirch 312; 342.

Lauraceae

Cassytha filiformis L. "fatai." Parasitic on *Tarena*, Hürlimann 390; coastal strand, Kirch 304.

Hernandiaceae

Hernandia nymphaeifolia (Presl) Kubitzki. "fotulona;" "puko vili." *H. ovigera* Stickm. *H. peltata* Meissn. Mesophilous forest, Hürlimann 373; coastal strand, Kirch 264; 305.

Cruciferae

Lepidium virginicum L. Ruderal, Hürlimann 645.

Crassulaceae

Kalanchoe pinnata (Lam.) Pers. "te'e kosi." coastal strand, Kirch 243.

Rosaceae

Parinarium glaberrimum Hassk. "pipi." Second growth forest, Kirch 331. Timber used for building.

Leguminosae

Abrus precatorius L. "matamoho." Forest on mountain ridge, Hürlimann 353.

Acacia simplex (Sparrm.) Pedley. "tatangia."

A. simplicifolia (L. f.) Druce

Coastal forest, Hürlimann 370; coastal strand, Kirch 256.

Adenanthera pavonina L. "lopa." Second growth on ridge, Kirch 231. Fruit edible.

Caesalpinia major (Medic.) Dandy & Exell.

C. crista sensu Hürlimann, non L. "talatala

'amo." Forest on ridge, volcanic soil,

Hürlimann 351.

- Canavalia sericea Gray. "fue kula." Offshore coral islet, Kirch 271.
- Crotalaria retusa L. Coastal bush, calcareous soil, Hürlimann 375.
- Delonix regia (Boj.) Raf. " 'ohai." Cultivated, Hürlimann 379.
- Dendrolobium umbellatum (L.) Benth., f. hirsutum (DC.) Ohashi. "lala."
- Desmodium umbellatum (L.) DC.
Edge of dry forest on ridge, volcanic soil, Hürlimann 358; second growth, Kirch 285.
- Derris elliptica (Roxb.) Benth. "kava." Second growth forest, Kirch 238.
- Erythrina variegata L., var. orientalis (L.) Merr. "ngatae." Second growth forest, Kirch 233.
- Indigofera suffruticosa Mill. " 'akau veli." Second growth forest, Kirch 284.
- Inocarpus fagifer (Parkins. ex Z) Fosb. "ifi." Secondary forest on mountain ridge, volcanic soil, Hürlimann 357; cultivated or protected near village, Kirch 283.
- Mimosa pudica L., var. unijuga (Duchass. & Walp.) Griseb. Second growth, Kirch 318.
- Pueraria lobata (Willd.) Ohwi. "aka," "hakataha."
P. Thunbergiana (Sieb. & Zucc.) Benth.
Dry forest on ridge, volcanic soil, Hürlimann 354; mesophilous forest on coastal plain, calcareous soil, Hürlimann 640; second growth, Kirch 235. Tuber edible.
- Tephrosia purpurea (L.) Pers. "kavahuhu." Grassy edge of ridge, volcanic soil, Hürlimann 344; exposed locality, Kirch 180.
- Uraria lagopodioides (L.) Desv. "iku'ipuai." Roadside, Hürlimann 367.
- Vigna marina (Burm.) Merr. "fue lau tolu." Shore, on coral sand, Hürlimann 617; offshore islet. Kirch 270.

Rutaceae

- Citrus Aurantium L. "moli," "moli kai." By road in forest, Hürlimann 631; around garden house, Kirch 322.

Citrus limonia Osbeck. Observed by Kirch.

Simaroubaceae

- Suriana maritima L. "ngengie." Coral shore, Hürlimann 628.

Meliaceae

- Aglaia saltatorum* A.C. Sm. "langakali." Cultivated, Hürlimann 649.
- Dysoxylum Forsteri* (Juss.) C. DC. "mo'ota." Forest, Kirch 223; offshore islet, Kirch 282; climax forest, Kirch 291.
- Melia Azedarach* L. "sita." Second growth, Kirch 340.

Euphorbiaceae

- Acalypha boehmerioides* Miq. "hongohongo." Roadside, Hürlimann 396.
- Aleurites moluccana* (L.) Willd. "tuitui." Cultivated, Kirch 268.
- Bischofia javanica* Bl. "koka." Second growth forest, Kirch 237. Bark used for a brown dye.
- Breynia disticha* Forst. f., forma *nivosa* (W. G. Sm.) Croizat. Cultivated, and escaped, Hürlimann 400.
- Euphorbia Atoto* Forst. f. On sand at shore, Hürlimann 497.
- Euphorbia hirta* L. "sakisi." Grassland, Hürlimann 328. *E. pilulifera* L.
- Glochidion ramiflorum* Forst f. "malolo," and "mahame." Secondary forest, volcanic soil, Hürlimann 333.
- Homalanthus nutans* (Forst. f.) Pax. "fenua malala." Mesophilous forest, Hürlimann 332; coastal forest, Hürlimann 651; second growth forest on steep ridge, Kirch 219; 348.
- Jatropha Curcas* L. "fiki." Roadside, Hürlimann 644.
- Macaranga Harveyana* (Muell.-Arg.) Muell.-Arg. "loupata." Kirch 229; coastal strand, Kirch 251; second growth forest, Kirch 289.
- Manihot esculenta* Crantz. "manioka," and "mata ki eua," and "falaoa." Cultivated, Kirch 213; 215.
- Phyllanthus Niruri*, sensu Hürlimann, non L. Weed, Hürlimann 329.
- Phyllanthus simplex* Retz. Roadside, Hürlimann 397.
- Securinega samoana* Croizat. "poumuli." Mesophilous forest, volcanic soil, Hürlimann 339; second growth on ridge, Kirch 228. Best timber for house posts.

Anacardiaceae

- Mangifera indica* L. "mango." Cultivated, Kirch 316.
- Pleigynium timoriense* (DC.) Leenhouts. Regenerated forest near ridge summit, Kirch 187.

Rhus taitensis Guillem. "tavahi." Dry forest on ridge, volcanic soil, Hürlimann 346; regenerated forest near ridge summit, Kirch 175.

Wood used in construction.

Spondias dulcis Parkins. ex Z. "vi." Observed by Kirch.

Sapindaceae

Cardiospermum Halicacabum L. Weed, Hürlimann 626.

Elatostachys falcata (Seem.) Radlk. "ngatata."

Climax forest, Kirch 297.

Pometia pinnata J. R. & G. Forst. "tava."

Cultivated, Hürlimann 377; Kirch 349.

Rhamnaceae

Alphitonia zizyphoides (Soland.) Gray. Ridge summit, Kirch 173.

Colubrina asiatica (L.) Brongn. "fiho'a."

Coastal forest, Hürlimann 382; second growth forest, Kirch 234; coastal strand, Kirch 254; offshore islet, Kirch 278.

Tiliaceae

Triumfetta Bartramia L. "mo'osipo." Coastal strand, Kirch 248; weed, Kirch 207.

Triumfetta procumbens Forst f. "mo'osipo."

coastal strand, Kirch 303.

Malvaceae

Hibiscus Manihot L. "pele." Second year swidden, Kirch 192. Leaves eaten as greens. The blades are broadly cordate, and only shallowly lobed, instead of being deeply cleft. This variety is also in cultivation in Fiji and on Niue (Sykes: 113).

Hibiscus rosa-sinensis L. "kaute." Cultivated, Kirch 267.

Sida acuta Burm. f. "te'chosi." Weed, Hürlimann 643.

Sida rhombifolia L. "te'hoosi." Weed, Kirch 208.

Thespesia populnea (L.) Soland. ex Correa. "milo."

Offshore coral islet, Kirch 277. Wood used for house construction, and spear handles.

Sterculiaceae

Melochia aristata Gray. "mako." Secondary forest on ridge, volcanic soil, Hürlimann 362; mesophilous coastal forest, Hürlimann 627; second growth forest, Kirch 217.

Guttiferae

Calophyllum Inophyllum L. "feta'u." Coastal strand,
Kirch 260. Wood used for bowls.

Flacourtiaceae

Flacourtia Rukam Zoll. & Mor. in Mor. "filimoto."
Mesophilous forest at base of ridge, volcanic
soil, H rlimann 336; second growth forest,
Kirch 343.

Passifloraceae

Passiflora maliformis L. "vaini." Second growth
forest, Kirch 330. Fruit eaten.

Thymeliaceae

Phaleria acuminata (Gray) Gilg. "huni." Coastal
strand, Kirch 242.

Caricaceae

Carica Papaya L. "lesi." Observed by Kirch.

Lythraceae

Pemphis acidula J. R. & G. Forst. "ngingi'e."
Sandy coast, H rlimann 386; offshore islet,
Kirch 273. Trunks used for posts and firewood.

Barringtoniaceae

Barringtonia asiatica (L.) Kurz. "futu." Mesophil-
ous forest, H rlimann 374; coastal strand,
Kirch 336. Fruits used as fish poison.

Combretaceae

Terminalia Catappa L. "telie." Forest on ridge
top, volcanic soil, H rlimann 393; coastal strand,
Kirch 334; 335.

Terminalia litoralis Seem., var. tomentella
Hemsl. "telie." Offshore islet, Kirch 281.

Myrtaceae

Eugenia clusiaefolia Gray. "mafua."

Syzygium clusiaefolium (Gray) C. Mueller.
Mesophilous forest on ridge, volcanic soil,
H rlimann 340; ridge summit, Kirch 171. Wood
used for house posts.

Eugenia corynocarpa Gray. "heahea."

Syzygium corynocarpum (Gray) C. Mueller.
Second growth forest, Kirch 346. Fruit edible.

Eugenia dealata Burkill. "mafua ai lulu."

Syzygium dealatum (Burkill) A. C. Sm.
Climax forest, Kirch 298. Fruit eaten.

Eugenia malaccensis L. "fekika."

Syzygium malaccense (L.) Merr. & Perry
Cultivated, Kirch 329.

Eugenia neurocalyx Gray. "fekika vao."

Syzygium neurocalyx (Gray) Christoph.

Mesophilous coastal forest, Hürlimann 648.

Psidium Guajava L. Second growth forest, Kirch 317.

Sapotaceae

Burckella Richii (Gray) H. J. Lam. "kau." In village, Kirch 338.

Planchonella torricellensis (K. Schum.) H. J. Lam.

"kalaka." Climax forest, Kirch 292.

Ebenaceae

Diospyros elliptica (J. R. & G. Forst.) P. S.

Green, var. elliptica. "mapa." Mesophilous coastal forest, Hürlimann 345; climax forest on ridge top, Kirch 169. Fruit edible.

Diospyros samoensis Gray. "koka uli." Dry forest

on ridge, volcanic soil, Hürlimann 352; 361; second growth forest on ridge summit, Kirch 172.

Oleaceae

Jasminum didymum Forst. f. "tutu'ila." Forest on mountain ridge, volcanic soil, Hürlimann 365.

Loganiaceae

Geniostoma insulare A. C. Sm. & Stone, f. insulare.

"te'e pilo a Maui." Dry forest on mountain ridge, volcanic soil, Hürlimann 366; offshore islet, Kirch 275.

Apocynaceae

Alyxia stellata (Forst. f.) R. & S. "maile."

Forest on mountain ridge, volcanic soil, Hürlimann 347; 368; Kirch 174. Used for personal adornment.

Cerbera manghas L. Calcareous sandy coastal

forest, Hürlimann 624; second growth forest, Kirch 320.

Neiosperma oppositifolia (Lam.) Fosb. & Sacht.

"fao." Ochosia oppositifolia (Lam.) K. Schum. Coastal sandy forest, Hürlimann 391; coastal strand, Kirch 262; offshore islet, Kirch 280. Wood for house construction.

Asclepiadaceae

Hoya chlorantha Rech. Vine on rocks, Kirch 177.

Convolvulaceae

Ipomoea Batatas (L.) Poir. "kumala." Observed by Kirch.

Ipomoea indica (Burm.) Merr. Second growth on

ridge, 100 m. alt., Kirch 226.

Ipomoea macrantha R. & S. "pula."

Ipomoea tuba (Schlecht.) G. Don
Clearing in climax forest, Kirch 290.

Boraginaceae

Cordia subcordata Lam. "milo." Coastal
strand, Kirch 258; 259.

Messerschmidia argentea (L. f.) Johnston. "tohuni."
Offshore islet, Kirch 276.

Verbenaceae

Clerodendrum inerme (L.) Gaertn. Dry forest on
ridge, volcanic soil, Hürlimann 359; second
growth forest, Kirch 306.

Lantana Camara L. "talatala." In clearing,
Hürlimann 369; on rocks, Kirch 179.

Premna taitensis Schauer, var. rimatarensis
F. Br. "volovalo." Forest on ridge, volcanic
soil, Hürlimann 360; second growth forest,
Kirch 236; coastal strand, Kirch 247; second
growth, Kirch 319.

Stachytarpheta urticaefolia (Salisb.) Sims.
Roadside, Kirch 293.

Labiatae

Coleus sp. "kaloni." cultivated, Hürlimann 623.
Pogostemon Cablin (Blanco) Benth. Near garden
house, Kirch 326.

Solanaceae

Lycopersicon esculentum Mill. "temata." Observed
by Kirch.

Nicotiana Tabacum L. "tapaka Tonga." Observed
by Kirch.

Physalis minima L. "ku'uai." Roadside, Hürlimann
395.

Solanum amjcorum Benth. "polo Tonga." Strand,
Kirch 302.

Solanum nigrum L. "polo kai." In garden, Kirch
190; in clearing, Kirch 296. Eaten like pepper.

Scrophulariaceae

Lindernia crustacea (L.) F. Muell. Weed by path,
Hürlimann 393.

Rubiaceae

Borreria laevis (Lam.) Griseb. "mohuku." Weed,
Kirch 244.

Gardenia rotumaensis St. John. "siale Lotuma."
cultivated, Kirch 344.

Geophila herbacea (Jacq.) Ktze. In shade of Cocos,

Kirch 212.

Guettarda speciosa L. "puapua." Coastal strand,
Kirch 261.

Morinda citrifolia L. "nonu." Mesophilous coastal
forest, Hürlimann 392; coastal strand, Kirch
218; 257.

Psychotria insularum Gray. "ola vai." Mesophilous
secondary forest, volcanic soil, Hürlimann 331;
climax forest, Kirch 221; 227; 286.

Randia cochinchinensis (Lour.) Merr. "ola."
Mesophilous forest on ridge, volcanic soil,
Hürlimann 330; climax forest on summit, Kirch
170; 209; coastal strand, Kirch 255.

Tarenna sambucina (Forst. f.) Durand. "manonu."
Saline coast, Hürlimann 389; Kirch 225; climax
forst, Kirch 288.

Cucurbitaceae

Momordica Charantia L. "vaini ai kumā." Weed in
third year swidden, Kirch 204.

Goodeniaceae

Scaevola Taccada (Gaertn.) Roxb., var. Taccada.
"ngahu." Coastal strand, Kirch 263.

Scaevola Taccada (Gaertn.) Roxb., var. sericea
(Vahl) St. John. "ngahu." Offshore islet,
Kirch 274.

Compositae

Ageratum conyzoides L. Garden weed, Kirch 214.

Vernonia cinerea (L.) Less., var. parviflora
(Reinw. in Bl.) DC. Weed, third year swidden,
Kirch 210.

Wedelia biflora (L.) DC. " 'ate." Offshore islet,
Kirch 272.

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200: 1-321, figs. 1-45.
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Bishop Mus., Bull. 220: 1-283, figs. 1-17.

ADDENDA

Pandaceae

Pandanus Whitmeeanus Martelli. "paongo." Grove by roadside between Hihifo and Matavai, Kirch 265. Leaves used for mats; fruit reddish orange, fragrant, used for garlands.

Malvaceae

Hibiscus tiliaceus L. "fau." Common, observed by Kirch

Bombacaceae

Ceiba pentandra (L.) Gaertn. "vavae." In Hihifo village, semi-cultivated, Kirch 350.